

REMARKS/ARGUMENTS

Favorable reconsideration and allowance of the present application are respectfully requested in view of the following remarks.

Claims 1-12 were pending prior to the Office Action. In this Amendment, claims 25-28 are added. Therefore, claims 1-12 and 25-28 are pending.

A. WITHDRAWAL OF PREVIOUS REJECTIONS

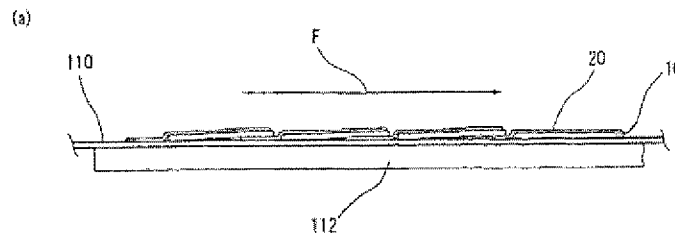
Applicants appreciate the withdrawal of previous grounds of rejections in light of the Pre-Appeal Brief submitted on May 3, 2010.

B. §103 REJECTION – SHIMOTOMAI, TOYAMA, MEYER, TONARI

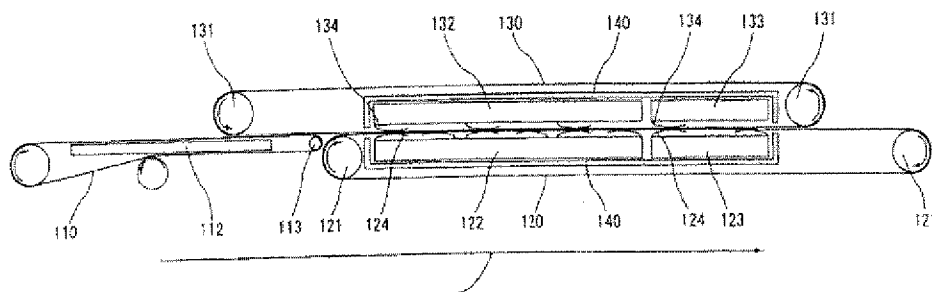
Claims 1-4, 11 and 12 stand rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Shimotomai (U.S. Patent No. 6,367,530) in view of Toyama (JP 11278626 A) and Meyer (U.S. Patent No. 4,997,507), and further in view of Tonari (JP 2000-022188 A). Applicants respectfully traverse.

A non-limiting aspect of the present invention is directed toward a solar battery module production method utilizing a production apparatus. The solar battery module is produced by electrically connecting a plurality of solar battery cells to one another by interconnectors. For example, as illustrated in Fig. 5(a) (reproduced below) solar battery cells 10 are electrically connected in series by the interconnectors 20.

Fig. 5



In the production method, the interconnectors are soldered to the battery cells while interconnectors and the battery cells are continuously transported in the transport direction F as shown. A production apparatus such as the one illustrated in Fig. 1 of the present disclosure (reproduced below) is used.

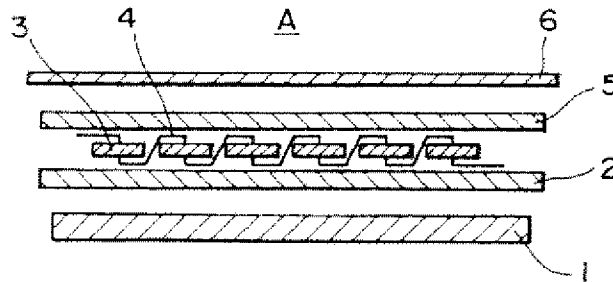


The example production apparatus 100 includes a positioning belt 110, a heating belt 120 and a press belt 130. The positioning belt 110 and the heating belt 120 are located adjacent to each other in a transferable manner, and the press belt 130 extends over the positioning belt 110 and the heating belt 120 in opposed relation to the positioning and heating belts 110, 120.

In the production method, the battery cells 10 and the interconnectors 20 can be placed on the positioning belt 110 in proper positional relation upstream of the positioning belt 110. The positioning belt 110 positions and transports the battery cells 10 and the interconnectors 20 to the adjacent

heating belt 120. The press belt 130 extends over both the positioning belt 110 and the heating belt 120, and functions to press the cells 10 and the interconnectors 20 as they are transferred from the positioning belt 110 to the heating belt 120. The press belt 130 also functions to press the cells 10 and the interconnectors 20 as they are soldered while being transported on the heating belt 120. In the claimed production method and apparatus, the solar battery cells are electrically connected to each other through soldering.

In the Office Action, newly cited reference Shimotomai is primarily relied upon to allegedly disclose the features of independent claim 1. Shimotomai is directed to a conveyor apparatus for lamination. Fig. 1 of Shimotomai reproduced below illustrates an example of a multilayer material to be processed, i.e. laminated.



The multilayer material A includes photovoltaic modules 3 in between two sheet-like fillers 2, 5. The sheet-like fillers 2, 5 and the photovoltaic modules 3 are stacked on a glass plate 1, and a backing member 6 is disposed in an uppermost position. Ribbon-like electrodes 4 connect the individual photovoltaic modules 3 together. *Shimotomai, c.6, ll.8-16.*

Note that the photovoltaic modules 3 are already electrically connected to each other through the interconnectors 4. The laminating process described in Shimotomai is not for the purpose of electrically connecting the photovoltaic modules 3 to each other. Rather, the described process is to laminate the already electrically interconnected photovoltaic modules for protection purposes. Shimotomai describes that filler material such as EVA (ethylene-vinyl-acetate) resin is melted and cured so that the solar panel made of the photovoltaic modules is protected so as to slowdown to degradation of the modules. *Shimotomai, c.1, ll.27-59*. Thus, it is seen that Shimotomai is not directed to producing the solar battery module itself.¹

There are specific differences as well. In the claims, the press belt overlaps at least a portion of the positioning belt. This allows the battery cells and the interconnectors to be held between the positioning and the press belts while being transported from the positioning belt onto the heating belt. This feature is captured in claim 1, which recites "transferring the solar battery cells and the interconnectors transported to the downstream portion of the positioning belt onto the heating belt while holding the solar battery cells and the interconnectors between the positioning belt and the press belt."

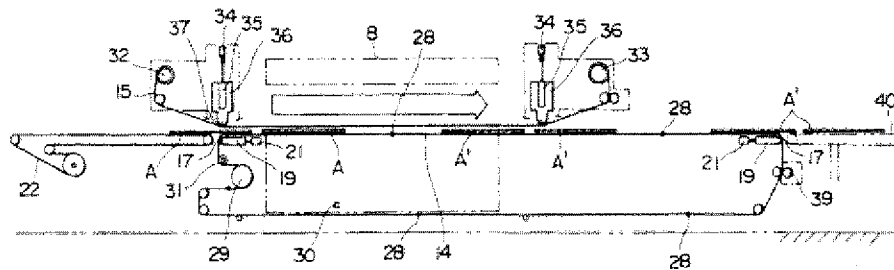
Also, the press belt overlaps the heating belt and functions to press the battery cells and the interconnectors as they are transported on the heating

¹ The claimed invention and Shimotomai maybe complimentary. For example, the photovoltaic modules may be interconnected to each other using the claimed method and apparatus, and the resulting solar battery may be laminated for protection using the process and apparatus described in Shimotomai.

belt, so as to hold the battery cells and the interconnectors while they are soldered and transported. This feature is captured by the recitation "holding the solar battery cells and the interconnectors transferred onto the heating belt between the heating belt and the press belt and soldering the interconnectors to the solar battery cells while transporting the solar battery cells and the interconnectors" in claim 1.

In the Office Action, the Examiner refers to Fig. 11 of Shimotomai (reproduced below) to allege that the claimed features are disclosed. In particular, the Examiner alleges that the carrying-in conveyor 22, the lower side belt 14, and the upper side belt 15 are equivalent to the claimed positioning belt, heating belt, and the press belt, respectively.

FIG.11



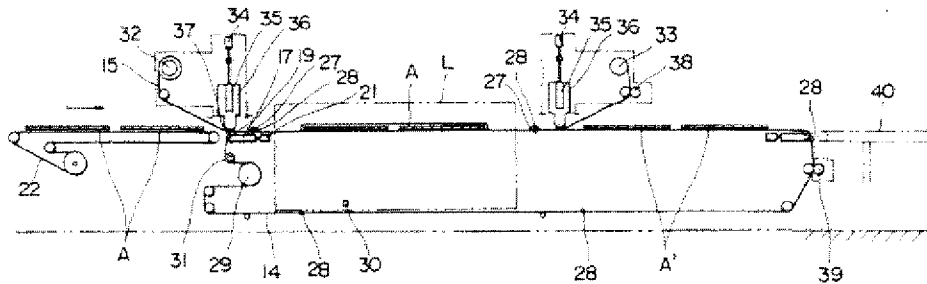
In Shimotomai, the multilayer material "A" is never held between the upper side belt 15 and the lower side belt 14, and also is never held between the upper side belt and the carrying-in conveyor 22.

Figs. 8-15 of Shimotomai illustrate implementation states where the multilayer material A is conveyed by the conveyor apparatus. Generally, the multilayer material A is conveyed from the carrying-in conveyor 22 onto the

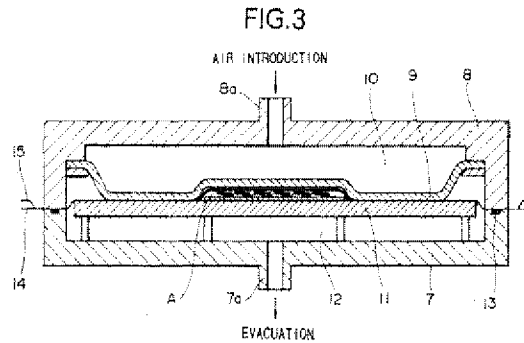
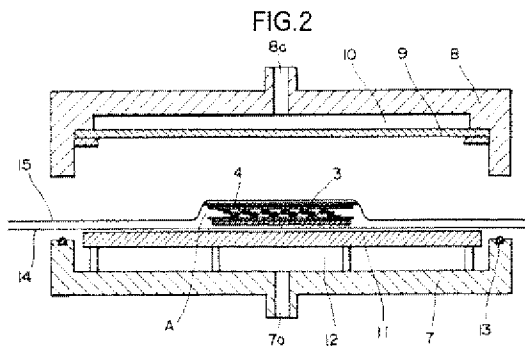
lower side belt 14 to a position corresponding to the vacuum vessel. Then the conveying is stopped and the multilayer material A is processed, i.e. laminated. After the processing completes, the processed multi-layer material is conveyed onto the carrying-out conveyor 40 and the next multilayer material to be process is conveyed into the processing vacuum vessel, and the process repeats. *Shimotomai, c.7, l.38 - c.38, l.50.*

Initially, multilayer material A is placed on the carrying-in conveyor end 22 to be processed in the laminator (Fig. 8). *Shimotomai, c.8, ll.13-18.*

FIG.8



In the laminating process, the vacuum vessel 7 is closed by the lid 8 (Figs. 2 and 3).



After the lid 8 is closed, the multilayer material A is heated and the vacuum vessel is evacuated so that the multilayer material A is pressed on the heating plate 11 by the diaphragm 9. The fillers 2 and 5 are melted by the heat and the multilayer material A is degassed so that the multilayer material is formed in a laminated body. Finally, the lid 8 is opened and the laminated body is taken out. *Shimotomai, c.6, ll.17-43.*

After the laminating process completes, the lid 8 of the vacuum vessel 7 is opened (Fig. 9) and the upper side belt 15 is slightly lifted (Fig. 10).

FIG.9

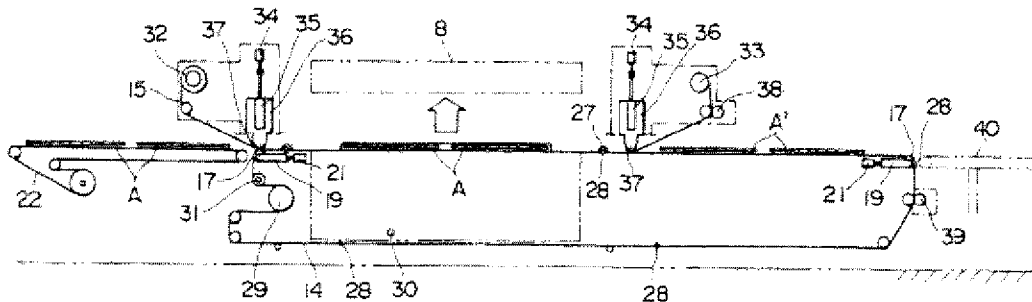
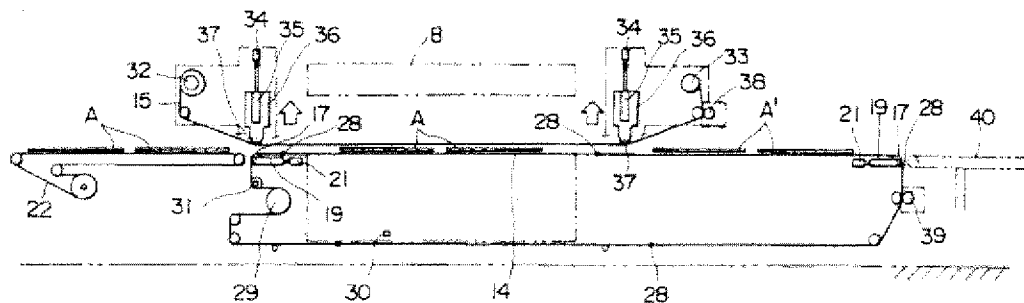
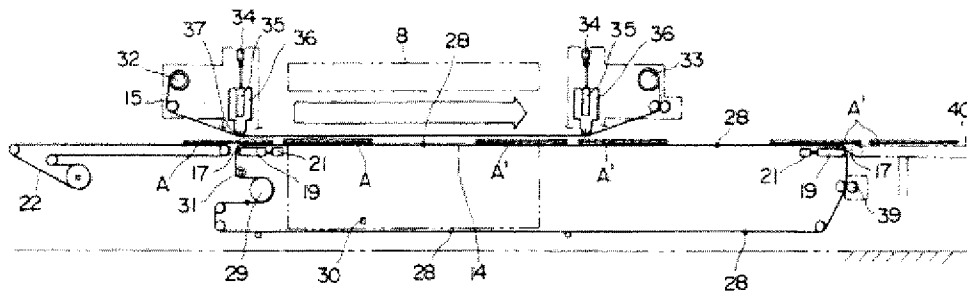


FIG.10



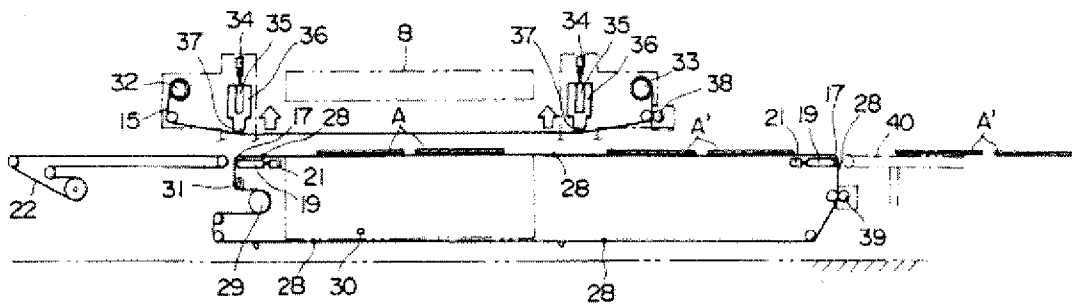
After the upper side belt 15 is lifted, the multilayer materials are conveyed (Fig. 11).

FIG.11



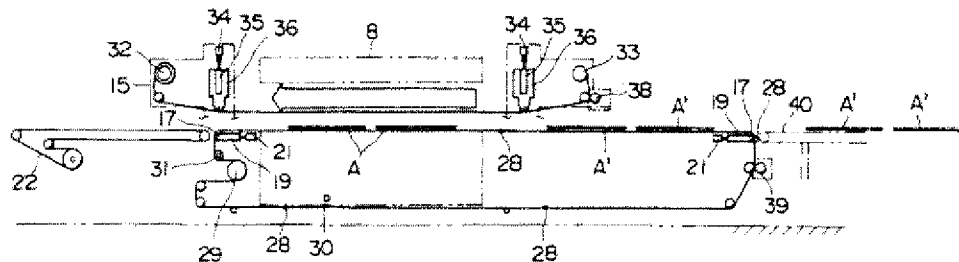
After conveyance of the multilayer materials, the upper side belt 15 is further lifted to a higher position (Fig. 12)

FIG.12



After being further lifted, the upper side belt 15 is rewound (Fig. 13).

FIG.13



After the rewinding completes, the upper side belt 15 is lowered to its original position (Fig. 14), and the lid is closed (Fig. 15) for another processing.

Shimotomai, column 8, lines 24-50.

FIG.14

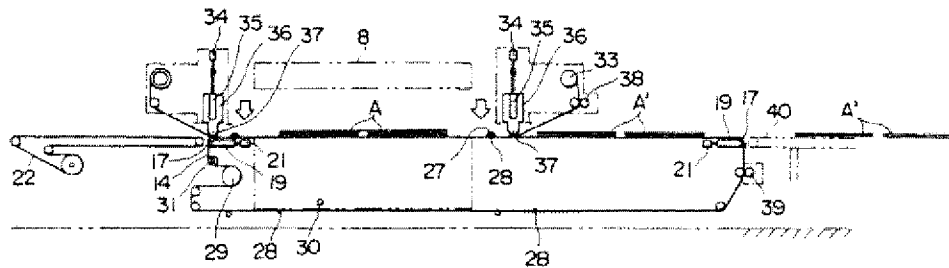
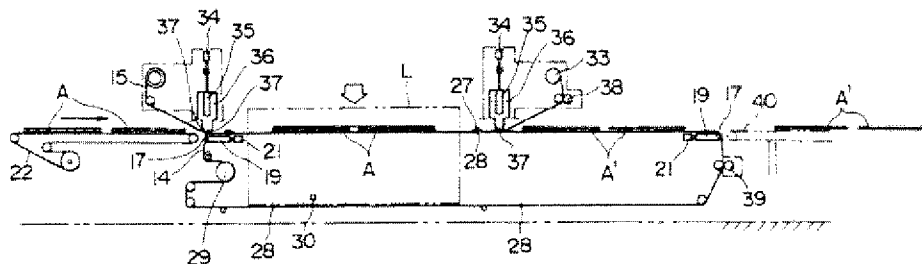


FIG.15



Shimotomai makes clear that the upper side belt 15 is always lifted when the multilayer material A is being transported. As a result, the upper side belt 15 plays no role in holding the multilayer material A when the material A is being conveyed.

Since the upper side belt 15 plays no holding role whatsoever, the multilayer material A is never held between the upper side belt 15 and the lower side belt 14 while the multilayer material is transported. Thus, Shimotomai cannot disclose "holding the solar battery cells and the interconnectors transferred onto the heating belt between the heating belt and

the press belt and soldering the interconnectors to the solar battery cells while transporting the solar battery cells and the interconnectors” recited in claim 1.

Also since the upper side belt 15 plays no holding role, Shimotomai cannot disclose the feature of “transferring the solar battery cells and the interconnectors transported to the downstream portion of the positioning belt onto the heating belt while holding the solar battery cells and the interconnectors between the positioning belt and the press belt.”

None of the references Toyoma, Meyer and Tonari, individually or in combination, correct the above noted deficiencies of Shimotomai. This is sufficient to distinguish claim 1 from Shimotomai, Toyoma, Meyer and Tonari.

The following is also noted. In the Office Action, the Examiner asserts that Shimotomai discloses holding the solar battery cells and the interconnectors, and melting fillers to form a laminated solar module. The Examiner alleges that Tonari is directed to tab-lead soldering in the manufacture solar battery cells. In essence, the Examiner proposes to modify Shimotomai such that rather than melting the fillers, solders would be melted instead.

One of ordinary skill would not do this. Regarding the multilayer material A to be laminated, the photovoltaic modules are already interconnected electrically through interconnectors 4. Thus, at the very least, there would be no need to replace the filler with solder since the modules are

already interconnected. Further, laminating with solder as the Examiner suggests would compromise the functioning of the solar battery module.

For at least the above stated reasons, claim 1 is distinguishable over the combination of Shimotomai, Toyoma, Meyer and Tonari. For similar reasons, claim 3 is also distinguishable over the same references. Claims 2, 4, 11 and 12 are distinguishable over Shimotomai, Toyoma, Meyer and Tonari by virtue of their dependencies from independent claims as well as on their own merits.

Applicants respectfully request that the rejection of claims 1-4, 11 and 12 be withdrawn.

**C. § 103 REJECTION – SHIMOTOMAI, TOYAMA, MEYER, TONARI,
FOCKE ET AL.**

Claims 5-10 stand rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Shimotomai in view of Toyama, Meyer and Tonari as applied to claims 1 and 3 above, and further in view of Focke et al. (U.S. Patent No. 5,674,542). Applicants respectfully traverse.

It is demonstrated above that claims 1 and 3 are distinguishable over Shimotomai, Toyoma, Meyer and Tonari. Focke et al. does not cure the above noted deficiencies. Therefore, claims 1 and 3 are also distinguishable over Shimotomai, Toyoma, Meyer, Tonari and Focke et al. Claims 5-10 are also distinguishable over the same applied references by virtue of their dependencies from independent claims 1 and 3 as well as on their own merits.

Applicants respectfully request that the rejection of claims 5-10 be withdrawn.

D. NEW CLAIMS

Claims 25-28 are added. No new matter is presented. The new claims are distinguishable over the applied references of record by virtue of their dependencies from independent claims as well as on their own merits. Applicants respectfully request that the new claims be allowed.

E. CONCLUSION

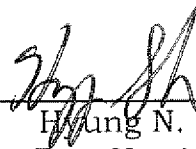
All objections and rejections raised in the Office Action having been addressed, it is respectfully submitted that the present application is in condition for allowance. Should there be any outstanding matters that need to be resolved, the Examiner is respectfully requested to contact Hyung Sohn (Reg. No. 44,346), to conduct an interview in an effort to expedite prosecution in connection with the present application.

The Commissioner is authorized to charge the undersigned's deposit account #14-1140 in whatever amount is necessary for entry of these papers and the continued pendency of the captioned application.

Respectfully submitted,

NIXON & VANDERHYE P.C.

By: _____



Hwang N. Sohn
Reg. No. 44,346

HNS/edg
901 North Glebe Road, 11th Floor
Arlington, VA 22203-1808
Telephone: (703) 816-4000
Facsimile: (703) 816-4100